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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,597	06/24/2003	Young Ho Park	2336-181	1487

7590 09/08/2006

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EXAMINER

LEWIS, MONICA

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 09/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,597	PARK ET AL.	
	Examiner	Art Unit	
	Monica Lewis	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5 and 24-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 24-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed June 27, 2006.

Response to Arguments

2. Applicant's arguments with respect to claims 5 and 24-38 have been considered but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

3. The information disclosure statement filed 2/1/06 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5 and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (Japanese Patent No. 2001-74333) in view of Akita et al. (Japanese Publication No. 11-068157).

In regards to claim 5, Okazaki discloses the following:

a) a first conductive GaN clad layer (11) which is a crystalline layer with an n-type impurity (For Example: See Abstract and Figure 2);

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b) a first contact (1) formed on and in direct contact with an upper surface of the first conductive GaN clad layer (For Example: See Abstract and Figure 2);

c) an active layer (10) formed on a lower surface of the first conductive GaN clad layer (For Example: See Abstract and Figure 2);

d) a second conductive GaN clad layer (9) formed on a lower surface of the active layer wherein the second conductive GaN clad layer is a GaN crystalline layer doped with a p-type impurity (For Example: See Abstract and Figure 2);

e) a conductive adhesive layer (8) formed below the second conductive GaN clad layer (For Example: See Abstract and Figure 2);

f) a conductive substrate (7) formed on a lower surface of the conductive adhesive layer (For Example: See Abstract and Figure 2); and

g) a second contact (14) formed on a lower surface of said substrate (For Example: See Abstract and Figure 2).

In regards to claim 5, Okazaki fails to disclose the following:

a) the conductive adhesive layer is made of a material selected from the group consisting of Au-Sn, Sn, In, Au-Ag and Pb-Sn.

However, Akita et al. ("Akita") discloses the use of a conductive adhesive layer made of Au-Sn (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of a conductive adhesive layer made of Au-Sn as disclosed in Akita because it aids in providing good light emission performance (For Example: See Abstract).

Additionally, since Okazaki and Akita are both from the same field of endeavor, the purpose disclosed by Akita would have been recognized in the pertinent art of Okazaki.

In regards to claim 26, Okazaki discloses the following:

a) the conductive substrate is made of a material selected from the group consisting of silicon, germanium and GaAs (For Example: See Abstract).

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In regards to claim 27, Okazaki discloses the following:

a) the active layer is in direct contact with the lower surface of the first conductive GaN clad layer (For Example: See Figure 2).

In regards to claims 28 and 30, Okazaki discloses the following:

a) the conductive adhesive is in direct contact with a lower surface of said second GaN clad layer, and the conductive substrate is in direct contact with the lower surface of the conductive adhesive layer (For Example: See Figure 2).

In regards to claim 29, Okazaki discloses the following:

a) the second contact is in direct with and covers the entire lower surface of said conductive substrate (For Example: See Figure 2).

6. Claims 24, 25 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (Japanese Patent No. 2001-74333) in view of Akita et al. (Japanese Publication No. 11-068157) and Chien et al. (U.S. Patent No. 6,492,661).

In regards to claim 24, Okazaki discloses the following:

a) a the second GaN layer and the conductive adhesive layer (For Example: See Figure 2).

In regards to claim 24, Okazaki fails to disclose the following:

a) a reflective layer.

However, Chien et al. ("Chien") discloses the use of a reflective layer (156) (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of a reflective layer as disclosed in Chien because it aids in reflecting light (For Example: See Abstract).

Additionally, since Okazaki and Chien are both from the same field of endeavor, the purpose disclosed by Chien would have been recognized in the pertinent art of Okazaki.

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In regards to claim 25, Okazaki fails to disclose the following:

a) the reflective layer is made of a material selected from the group consisting of Au, Ni, Ag, Al and alloys thereof.

However, Chien discloses the use of a reflective layer consisting of Au, Ni, Ag, Al and alloys thereof (For Example: See Column 7 Lines 65-67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of a reflective layer as disclosed in Chien because it aids in reflecting light (For Example: See Abstract).

Additionally, since Okazaki and Chien are both from the same field of endeavor, the purpose disclosed by Chien would have been recognized in the pertinent art of Okazaki.

In regards to claims 32 and 36, Okazaki discloses the following:

a) a the second GaN layer and the conductive adhesive layer (For Example: See Figure 2).

In regards to claims 32 and 36, Okazaki fails to disclose the following:

a) a reflective layer.

However, Chien discloses the use of a reflective layer (156) (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of a reflective layer as disclosed in Chien because it aids in reflecting light (For Example: See Abstract).

Additionally, since Okazaki and Chien are both from the same field of endeavor, the purpose disclosed by Chien would have been recognized in the pertinent art of Okazaki.

In regards to claims 33 and 37, Okazaki discloses the following:

a) the active layer is in direct contact with the lower surface of the first conductive GaN clad layer (For Example: See Figure 2).

In regards to claims 34 and 38, Okazaki discloses the following:

a) the second contact is in direct with and covers the entire lower surface of said conductive substrate (For Example: See Figure 2).

In regards to claim 35, Okazaki discloses the following:

a) an upper surface defined together by said first contact and said upper surface of the first conductive GaN clad layer (For Example: See Figure 2);

b) a lower surface defined by a lower surface of said second contact (For Example: See Figure 2); and

c) opposite side surfaces extending between and connecting said upper and lower surfaces of said diode (For Example: See Figure 2).

In regards to claim 35, Okazaki fails to disclose the following:

a) a reflective layer.

However, Chien discloses the use of a reflective layer (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of a reflective layer as disclosed in Chien because it aids in reflecting light (For Example: See Abstract).

Additionally, since Okazaki and Chien are both from the same field of endeavor, the purpose disclosed by Chien would have been recognized in the pertinent art of Okazaki.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (Japanese Patent No. 2001-74333) in view of Akita et al. (Japanese Publication No. 11-068157) and *Tin* by Joseph B. Long.

In regards to claim 31, Okazaki fails to disclose the following:

a) the conductive adhesive layer is made from one selected from the group consisting of Sn and In.

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However, Long discloses the use of Sn (For Example: See Pages 1-5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Okazaki to include the use of tin as disclosed in Long because it aids in providing resistance to corrosion (For Example: See Page 1).

Additionally, since Okazaki and Long are both from the same field of endeavor, the purpose disclosed by Long would have been recognized in the pertinent art of Okazaki.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular and after final communications.

ML
September 4, 2006

A handwritten signature in black ink, consisting of stylized, overlapping loops and a long horizontal stroke extending to the right.